of the book is comprehensive enough to include the majority of key topics.

Simon and Darby, the editors, in chapter one provide a concise and useful introduction, carefully linking together the various contributions as well as providing a review of past work. The scope, purpose and structure of the book are clearly specified. Schumm in chapter two outlines the main causes and controls of channel incision. This is wholly appropriate given that Schumm *et al.* (1984) published the pioneering work *Incised Channels: Morphology, Dynamics and Control*.

The aim of the second section of the book is 'to promote understanding of incised channel evolution in a range of environments' (p. 13). 'Environment' here is clearly taken to mean both geographical and process environments because the coverage jumps from semi-arid to humid and from headwaters to floodplain lowlands. Furthermore, the aim of this section could have been restated: 'to promote understanding of incised channel evolution in a range of environments *and at a variety of scales'*. A large range of space and time scales is considered from the particle scale of sorting and degradation of mixed grain sizes to river basin response; and from fluctuations in bedload transport rates to evolution over the Quaternary. Mentioning variety is by no means a criticism, as the wide range of studies merely reflects the importance of these rivers and the different approaches required to study the processes and morphology of incised channels.

The third section of the book summarizes approaches which use knowledge of incised river channel geomorphology in engineering and management settings. These specific contributions highlight a more general trend in river engineering, aimed at minimizing intrusive erosion-control measures and promoting more sympathetic management strategies which try to address the underlying cause of incision, rather than merely to treat the problem. This is illustrated with a variety of European and North American examples.

The target audience for this book is primarily academics; advanced level students studying fluvial geomorphology and river engineering; and practitioners interested in incised river channels. This seems wholly appropriate given the style and level of the material. The production quality of the diagrams and photographs (including eight coloured figures) is generally excellent. A few figures would have benefited from redrafting. Overall this is a good book. Whether it is read in its entirety or dipped into for individual chapters there is much to be learnt from this volume. The theme is of sufficiently broad interest that it should be popular; however, the price will ensure it will be largely restricted to library shelves. It is well worth having in a library collection next to Schumm *et al.* (1984) and perhaps Dalrymple *et al.* (1994) *Incised-Valley Systems: Origin and Sedimentary Sequences* which provides a sedimentary perspective on incised river systems.

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GLOBAL ENERGY AND WATER CYCLES edited by K.A. Browning and R.J. Gurney, Cambridge University Press, Cambridge 1999. No. of pages: 292. Price: £ 50·00. ISBN 0 521 56057 8

This collection of reviews treats an important aspect of climate, and a growing subject of current research. It is timely, having arisen from a conference in only July 1994. It charts the observed route of water, from evaporation to condensation, via cloud properties in solar and terrestrial wavelengths, to precipitation, to the ocean. There are consequences for the contrasting stratification of the ocean in terms of temperature and salinity. Over land the water path is traced through hydrological pathways and vegetation. The remaining energy cycle is completed through solar and terrestrial wavelength radiative pathways and convection of sensible heat.

Use is made of conventional station data, mainly from the 1963–75 campaigns, through special campaigns, to global satellite data up to the present. Some aspects of numerical models are reviewed and data acquired through such models are compared with the observations.

Many experts are needed to cover this extensive field and one consequence is the wide variety of presentations and of attitudes. It is refreshing to see the differences between the pure scientist, the atmospheric modeller and the more applied scientist, but there are disadvantages to the specialist approach. There are too many acronyms, but there always are in everyone else's work. More importantly, almost nobody simplifies anything. We nearly always finish up in what I call the stomata trap: all the water evaporated by a plant must pass through these tiny holes; therefore we must understand the mechanism of the guard cells that govern how much they open. That to my mind is like saying that the number of people in the audience depends on how many go through the door, yet how many people want to see the play after reading the review does matter, and this overall consideration may be what the specialist can really contribute.

With heavily committed funding, when the first criterion of success is that you need a bigger computer, it is evidently difficult to say that we now understand the relation between processes so well that we can present them in more compact form, and therefore we do not need that computer after all. But isn't understanding things what the philosophy of science is all about?

The exceptions stand out, such as that tropical clouds reflecting about as much radiation as they fail to re-radiate from their cold tops 'may be fortuitous', or Feynman's quip about dynamical meteorologists concerned with the flow of dry water. Bravo! There is a hint of parochialism. Ludlam's *Clouds and storms* does not appear in the cloud physics references, perhaps because he envisaged a larger context and thought that cloud microphysics played a minor role in determining the structure of clouds?

Although many diagrams are drawn specially for this publication I often found myself wanting to refer back to the originals to understand quite what was plotted; monthly rainfall in units of 'mm (at first day)' had me puzzled for a time. Some of the diagrams are almost useless, perhaps because they were reproduced in monochrome from colour-coded computer plots, which ought to be banned anyway (together with those forests of alleged arrows, that dynamic meteorologists sometimes produce). But apart from technical variations, attitudes are contrasting. Some articles are masterly but evasive, many contain valuable information: the average depth of a river is 1·5 cm; we know the global average heat flux give-or-take 10^{15} W; existing global data may be reanalysed each 5–10 years, using the latest numerical model; it would take 10^{10} year to generate the oceans from water from the core (but from where else?).

An essential book for the library, but no poetry. Waters above, but no eternal springs . . .

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ARIDITY, DROUGHTS AND HUMAN DEVELOPMENT by Monique Mainguet, Springer, Berlin 1999. No. of pages. 302. Price: DM 149·00, £ 57·50. ISBN 3 540 63342 1

The book is a translation of the French version *L'Homme et la Secheresse* published in 1996. It commences with a series of questions concerning dryland environments, which, it is argued, remain to be answered. The author asks if drylands are desiccating, are droughts becoming more virulent, and why have development attempts failed? Such questions have been asked in the past, especially in the 1980s, and one measure of the book's value is whether any new insights and answers can be provided. The book's aims suggest how this will be tackled.

The aim of the book (p. vi) 'is to illustrate convincingly the primordial importance of the factor environment in development.' This stance raises the spectre of environmental determinism but I am in agreement with the author in that it is time for some re-evaluation of the significance of the physical environment in drylands. Perhaps too much attention has been paid to the role of human, especially economic, systems leading to the disregard of environmental influences. Whether the environment is of 'primordial importance' is however a matter for further discussion, which is beyond the scope of a book review.

The rationale for the book is the premise that drylands cover a large proportion of the Earth's surface where the development of water resources is problematic and increasingly difficult in the face of demographic change, climate change and frequent droughts. Much of the material is challenging and this is not an 'entry-level' text to the study of drylands. It is full of detailed analyses and case studies from various parts of the arid realm. It is provocative in places and should appeal to a broad range of dryland specialists. For example, a plea is made for the re-introduction of zonal (regional) geography and for 'geohistory' which (p. 3) 'forces a scientist to consider the geographical environment before looking at the historic situation.' Thus the book is divided into four major sections dealing with:

- spatial framework (physical geography)
- environmental constraints (water and wind)
- geohistory (development of societies)
- decline (degradation of environment and economic system).

I found the earlier sections to be a mixture of some rather mundane descriptions of the physical conditions alongside some interesting discussions of the nature of environmental change. The book is then rather uneven in its content. Was it really necessary to have so much information on dryland soils? Why include wind in a text on water resources, aridity and drought?

The key characteristics of drought and aridity are described and the author, rightly in my opinion, distinguishes between aridity as a permanent water deficit and drought as a temporary phenomenon. She further identifies various different forms of drought from agricultural to meteorological. It was disappointing then to see an analysis of drought conducted solely on precipitation, i.e. meteorological drought. I had hoped to learn more about edaphic and agricultural droughts.

The two key physical processes of drylands are taken to be hydrological and aeolian. There is a systematic presentation of hydrological characteristics and their associated environmental problems from soil erosion to flash floods. Similarly the action of wind is discussed in detail with an emphasis upon soil erosion and sand dune classification. This will appeal to arid land geomorphologists but I would like to have seen clearer links to drought and aridity, e.g. more discussion of the importance of soil moisture. Having established the nature of the physical environment, the author seeks to explain the various ways in which humans